

## **SAC Consideration**

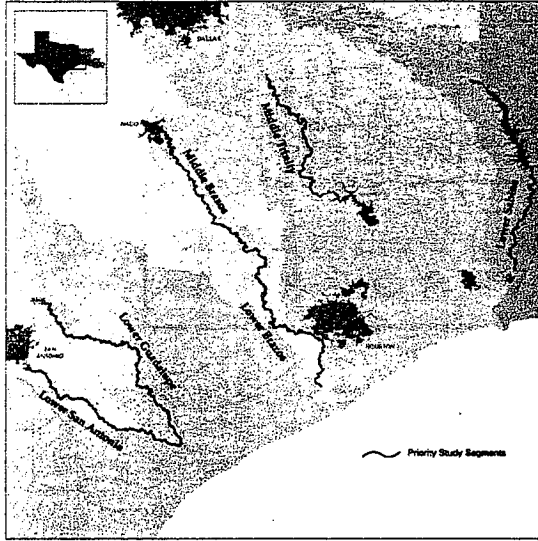
### **Peer Review of TIFP Study Designs**

- 1. Options**
- 2. Possible role for SAC**
- 3. Best option?**

### **Proposed TIFP Projects for TWDB Research and Planning Funds**

- 1. Objectives and Process**
- 2. Description (handout)**
- 3. Feedback?**

## SB2 Priority Studies



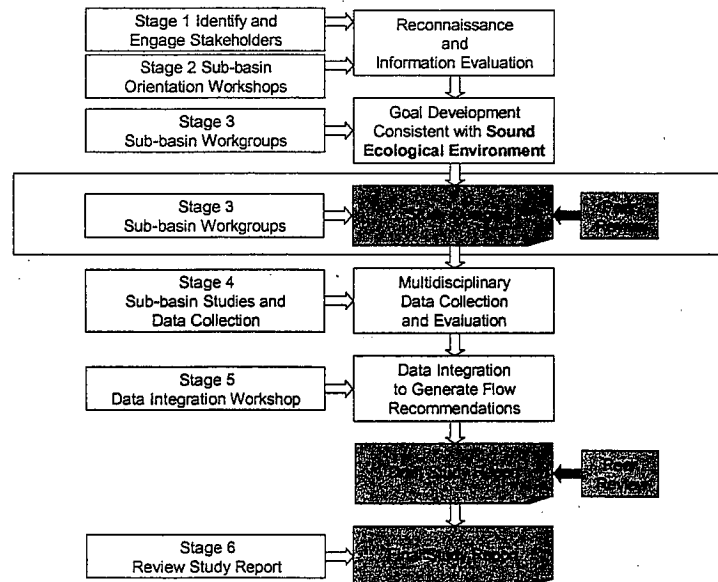
### Current Priority Studies

- Lower Sabine
  - Middle & Lower Brazos
  - Lower San Antonio
- Study Designs - 2009  
Completed Studies - 2012

### Remaining Priority Studies

- Middle Trinity
  - Lower Guadalupe
- Completed Studies - 2016

## Where are we now?



## Study Design Schedule

Instream Flow Study of the  
Lower San Antonio River and  
Lower Cibolo Creek

Draft Study Design



Prepared for  
Lower San Antonio River Basin Stakeholder Group

Prepared by  
TEXAS INSTREAM FLOW PROGRAM  
MAY 2009

### Lower San Antonio

• June 2009

### Lower Sabine

• July 2009

### Middle & Lower Brazos

• ~ August 2009

## Criteria for Peer Review of Draft Study Designs

1. Technical expertise
2. Familiarity with Texas and basin issues
3. Consistency across state
4. Timeliness
5. Cost

## **Peer Review Options**

### **1. Independently selected panel of experts**

- Sustainable Ecosystems Institute
- 3 to 5 reviewers – \$23,000 to \$33,000

### **2. TIFP selected panel of experts**

- Instream Flow Council (National)
- Environmental Advisory Committees (Basin)  
Part of Clean Rivers Program in each basin
- Individuals
- Gratis to \$4,000 or \$5,000 per reviewer

## **Peer Review Options**

### **3. Science Advisory Committee**

- “an objective scientific body”
- “develop recommendations to help provide overall direction, coordination, and consistency relating to:
  - B) environmental flow programs at the commission, the Parks and Wildlife Department, and the board;”
- Proposal: Entire SAC or sub-committee of SAC take on role of providing scientific peer review of study designs for SB2 priority segments

## **Research and Planning Fund Projects**

### **Objectives:**

- 1. Improve instream flow assessment techniques**
- 2. Collect and analyze data related to specific priority study sub-basins**

### **Examples:**

**<http://www.twdb.state.tx.us/InstreamFlows/fundedresearch.html>**

## **Research and Planning Fund Projects**

### **Process:**

- 1. Evaluate needs for projects**
- 2. Contact qualified investigators to gauge interest in projects**
- 3. Submit proposed projects for SAC review**
- 4. Submit to TWDB Board for approval**
- 5. Issue contracts with investigators**
- 6. End product is a report documenting results**

## ***Proposed Research and Planning Fund Projects***

### ***FY 2009 Funds – Total Available: \$335,569***

#### **1. Hydraulic/mesohabitat unit mapping on the Brazos River, \$40,000**

In order to ensure the consideration of appropriate scales and improve communication among the participating scientific disciplines, the Texas Instream Flow Program (TIFP) has adopted a specific nomenclature for riverine spatial scale. That nomenclature is loosely based on the *River Styles* geomorphologic nomenclature and various biologically based nomenclatures. This project will develop and demonstrate the utility of defining and using a mapping unit that corresponds to the scale where geomorphic and instream habitat concerns intersect. This project will coordinate with a currently ongoing project describing geomorphic units (a higher scale) as well as Project 2 below. The work will be conducted on two sites in the lower Brazos River. The objective will be to develop mapping units that can be delineated by physical measurements while having the greatest significance possible for instream habitat. Changes in the characteristics of each hydraulic/mesohabitat unit as a result of changes in flow rate will also be described. This project will develop and demonstrate techniques applicable to rivers across the State of Texas.

#### **2. Biologic sampling in hydraulic/mesohabitat units, \$51,700**

In coordination with the work described above, fishes will be sampled at the two sites. Sampling will occur across all units distinguished during geomorphic mapping. Fish sampling will involve multiple collections over a range of discharges, as well as in different seasons of the year. The objective will be refine definitions of hydraulic/mesohabitat units and evaluate fish-habitat relationships. Results will also be used to relate diversity of hydraulic/mesohabitats and biological diversity.

#### **3. Investigation of hydrologic flow conditions and triggers, \$28,800**

The flow regime approach adopted by the TIFP seeks to incorporate interannual (between year) flow variability. Flow recommendations will therefore be made for a variety of hydrologic conditions, such as wet, dry, and normal conditions. This project will investigate Texas rainfall and streamflow data to determine patterns and descriptions of hydrologic variability (such as wet, dry, and normal conditions). Once meaningful descriptions are identified, triggers that indentify the type of hydrologic conditions that will be encountered in the coming year or season will be investigated. Techniques will be evaluated and demonstrated on sets of data representing a variety of conditions across the state.

#### **4. Geomorphic assessment of the Guadalupe River, \$35,000**

This project will further geomorphic assessment and classification of the Lower Guadalupe River (downstream of Canyon Lake) based on the *River Styles* approach adopted by the TIFP. Analysis will be based on a combination of aerial photography, GIS data layers, and field observations. Results will include a geomorphic classification of the river suitable for describing and understanding the variation in environmental data along the length of the river.

#### **5. Development of sediment rating curves for the Brazos River, \$36,069**

This effort will collect suspended sediment and bed-load transport samples at USGS gage locations along the Middle and Lower Brazos River across a range of discharges. Data will be used to develop sediment rating curves for these stations, and will also be available for calibration and validation of sediment models. Data will be compared to available historical sediment data in order to evaluate possible changes in sediment transport rates.

**6. Hydraulic modeling workshop, \$30,000**

The Surface Water Modeling System (SMS) is currently used by TIFP as a pre- and post-processor for surface water modeling with both the RMA2 and FESWMS two-dimensional hydraulic modeling programs. These programs can be used for analysis of sub-critical flow conditions (RMA2 and FSWMS) or critical flow conditions (FESWMS only). This workshop will provide agency staff with training in using SMS, as well as ADaptive Hydraulics (ADH), a state-of-the-art modeling system developed by the Coastal and Hydraulics Laboratory of the US Army Corps of Engineers. ADH includes features such as two- or three-dimensional shallow water modeling capability, completely coupled sediment transport modeling, incorporation of groundwater conditions, and use of adaptive numerical meshes that improve model accuracy without sacrificing efficiency. This workshop will improve the hydraulic modeling skills of TIFP staff.

**7. Habitat characteristics of freshwater mussels in the Lower San Antonio and Lower Guadalupe rivers, \$35,000**

This funding will provide state matching funds as part of a larger project involving TPWD's State Wildlife Grant Program funded by federal dollars. The project will identify substrate and flow conditions that provide suitable freshwater mussel habitat at specific sites on the Lower San Antonio and Lower Guadalupe rivers, as well as relationships with host fish that play an important role in mussel reproductive cycles. Particular emphasis will be placed on golden orb (*Quadrula aurea*), a freshwater mussel species of special concern. Important physical parameters affecting mussel habitat will be analyzed, including substrate, depth, current velocity, and shear stress ratio. Results will inform mussel habitat- flow relationships, a critical component in the development of instream flow requirements. Mussel-fish associations in these systems will also be documented.

**8. Analysis of the evolution of oxbow lakes along the Brazos River, \$39,000**

This project will investigate the character and evolution of oxbow lakes along the Brazos River from the Bryan-College Station area to the Gulf of Mexico. Several oxbows lakes, representing a range of geomorphic development, from recent cutoffs to meander scrolls and remnant lakes, will be selected for detailed surveying. This study will encompass oxbow lakes where previous research evaluated relationships between fish assemblages and hydrologic connectivity. Time series aerial photographs of these sites will be analyzed. Sediment analysis and coring will provide additional details of evolution and stratigraphic history. Historical patterns and rates of evolution from initial to complete infilling will be determined and used to predict the lifetime of current oxbow lakes.

**9. Analysis of avulsion processes on the Brazos River, \$40,000**

This project will investigate the processes responsible for flow bifurcations (avulsions) in alluvial rivers during high pulse and overbank flows. Types of avulsions include bar cutoffs, meander bend cutoffs, and other splits in the river channel during high flows. These features may result in creation of diverse habitats such as secondary channels, backwater areas, oxbow lakes, and distributary channels. As part of this project, a literature review of the current understanding of the physical processes that create these features will be completed. This will be followed by field efforts to collect data required to assess and monitor these processes. Theoretical models will then be applied to evaluate historic and potential future conditions. An assessment of the development and stability of avulsions of the main channel of the Brazos River under different flow regimes will also be completed.